REMARKS

The applicants amend claim 1 as follows, with support for the changes shown in italic type:

1. A method for constructing a geologic model ~~predicting properties~~ of a hydrocarbon reservoir~~composite sedimentary body~~ in a subsurface region~~reservoir~~ and using the model to plan development or predict hydrocarbon volumes or production rates of the reservoir, comprising: *(Support for changes at p. 5 ln 10-11, and page 2 ln 20-24)*

(a) determining an~~at least a partial~~ outline of a~~the~~ composite sedimentary body in the subsurface region from stratigraphic surfaces identified from seismic data, other subsurface imaging techniques, well logs or outcrop observations, said composite sedimentary body comprising a plurality of fundamental bodies created by flowing, sediment-laden water; *(Support for changes at p.7 ln 27-29; p.8 ln 2-7; p. 4 ln 24-25; p. 5 ln 6-7; p. 4 ln 14-15)*

(b) characterizing properties of fundamental bodies in the composite sedimentary body;

(c) simulating generation of~~generating~~ a fundamental body based on the characterized properties of ~~the~~ fundamental bodies, wherein the fundamental body grows until it becomes large enough to divert the sediment-laden flow that creates it; *(Support for changes at p. 6 ln 30 to p. 7 ln 2; p. 10 ln 11-12; p. 4 ln 18-19)*

(d) placing the fundamental body into the ~~partial~~ outline of the composite sedimentary body; *(Support for change at p. 7, ln 27)*

(e) repeating steps (c) through (d) one or more times until the ~~partial~~ outline of the composite sedimentary body contains a plurality ~~is substantially full~~ of fundamental bodies;~~.~~ *(Variation of Examiner suggestion "includes;" also Fig. 3)*

(f) constructing a geologic model of a hydrocarbon reservoir in the subsurface region, said model being based on the fundamental bodies from the preceding step; and *(Support for new step at p. 2 ln 15-16; p. 5 ln 10-11)*

(g) using the geologic model to plan development or predict hydrocarbon volumes or production rates of the reservoir. *(Support at page 2 ln 20-24.)*

Similar amendments are made to the other two independent claims, claims 10 and 17.

The applicants believe that the amendments cure the informality objection to claim 1. Informality objections to claims 10, 17, 4, 8, and 20 are addressed by amendments shown in the attached listing of claims.

§ 112 rejections

The examiner believes that the term *is substantially full of* is indefinite. The applicants strenuously (yet respectfully) object to this rejection. Use of the word *substantially* is essential and common in claim drafting in U.S. patent practice. In the case of the present application, the examiner must understand from the application disclosure that the process of filling the outline with fundamental bodies is not like completing a jig saw puzzle. When the process is done, there will almost inevitably be spaces within the outline not occupied by a fundamental body. Moreover, the fundamental bodies will typically spill outside the outline to some extent and may overlap each other to some degree. The fit cannot be perfect because the process by which the fundamental bodies are grown is not constrained by the outline. A court has called use of a similar word of approximation (*about*) "heavily fact dependent." (*Zoltek Corp. v. U.S.*, 57 USPQ2d 1257 (US Ct Fed Cl 2000). The applicants submit that the facts of the present case weigh heavily in favor of allowing use of *substantially*. Use of a word such as *substantially* will best describe the invention. Nevertheless, compelled by the rejection, the applicants replace the term *is substantially full of* in the independent claims with the phrase *contains a plurality of*, which is supported by Fig. 3. The applicants also add a new dependent claim 24 to capture the upper limit of what the term *substantially full* can mean to any reader. Moreover, the applicants add new dependent claim 25 with the limitation *is substantially full of* in hopes that the examiner will reconsider this rejection and allow this limitation in the context of the invention.

In claim 13, line 6, the term *the channel* is corrected to *a channel*. The preamble of claim 17 is amended to replace the term *properties of a subsurface reservoir* with the term *the size, shape and height of a subsurface reservoir*. Support is at page 2, lines 15-16, and selecting three body properties (from, for example, claim 20) that are obviously revealed by the steps of the claim.

§ 101 rejections

The applicants believe that the amendments to claim 1 shown above cure any non-patentable subject matter problem, a geologic model of a hydrocarbon reservoir having obvious real world significance and value, as further specified in the final "using" step. Corresponding amendments to claims 10 and 17 complete the § 101 reform.

§ 103 rejections

The three independent claims are rejected as obvious over the paper referred to as *Syvitski Delta* in view of the paper referred to as *Syvitski Sedflux*. The applicants believe that the claim amendments make it clear that this rejection is improper. Both Syvitski papers disclose a method for constructing a geologic model wherein sediment is deposited into a basin in units of pre-specified time steps. (See below for specific cites to the Syvitski papers to support this argument.) The claimed method deposits the sediment into the basin in units of fundamental bodies. Each such step ends when the fundamental body grows large enough that it would begin diverting any additional sediment elsewhere. The amendments to step (c) above make this feature explicit. Syvitski's time steps have no correspondence to the applicant's fundamental bodies. Also, the product of Syvitski's simulations cannot at any time step be regarded as a fundamental body, because his simulations in both *Syvitski Sedflux* and *Syvitski Delta* are only 2-dimensional. (See the title of the *Syvitski Sedflux* paper "2D SEDFLUX . . ."; and in the *Syvitski Delta* paper, note the abstract, "This 2D model . . ." as well as the first sentence of the second paragraph of the article, "DELTA is an example of a unified 2-D process response model that simulates . . .") The defining characteristic of a fundamental body is its ability to divert the flow that built it, and in a 2D model, there is no third dimension into which the flow can be diverted. (New dependent claim 26 is added, and it is directed to 3D

model building with the present invention. Express support may be found at page 14 lines 2-4.) Syvitski's method generates one two-dimensional body. Since there are no fundamental bodies in Syvitski's method, there are also no *composite* bodies in his method. The claim amendments also make it clear that multiple fundamental bodies must be generated. Thus, step (e) of claim 1 is also neither disclosed nor suggested by either Syvitski paper.

The differences between the two methods have practical significance. The applicants' method builds a composite body having a statistically correct high resolution structure, and is computationally much faster than trying to simulate an equivalent sedimentary body by laying down differential sediment increments over millions of time steps as the Syvitski methods have to do.

Following are specific citations to both Syvitski papers regarding the time-step approach that he uses to generate his single body. From the *Syvitski Sedflux* paper:

(1) Page 741, second column, first full paragraph: "The next section [of the input file to the SEDFLUX program] lists **parameters that are constant** for a portion of the total run. Within this section are parameters defining the **length of this epoch**, the **time step of this epoch**, as well as process constants specific to this epoch. **Any number of epochs can be used for a single 2D SEDFLUX run**, and are listed in the sequence that they are to be run." (Emphasis added) This makes it clear that Syvitski's program runs a sequence of "epochs", where the duration of each epoch is defined by time. Within each epoch, a constant time step used to deposit or erode sediment is also specified. Thus the units by which sediment is added to the model are time steps, the size of which is predetermined.

(2) Page 743, second column, third paragraph: "Our second example is from a 12,000 year (daily) simulation for Knight Inlet, British Columbia..." The duration of the simulation is 12000 years, and the simulation is updated (i.e. sediment is deposited into the model) once per simulated day during the 12000 years.

(3) Pages 750 and 751, Table 4: item 39 gives the length of each epoch of the simulation in years, and item 40 gives the number of time steps per year, which is set to 365 to give daily updates to the model.

From the *Syvitski Delta* paper:

(1) Page 843, column 2, 5th paragraph from the bottom, in describing the subroutines of the software: "ITRATE **handles the accumulation of sediment from all sources** and, where applicable, the diffusion of seafloor sediment. **It is called at each time step.**" (Emphasis added) Thus sediment is accumulated into the model in units of time steps.

(2) Page 842, column 2: "Lines 15-34 of *userl* define parameters that remain constant for a user-specified period of years, or as determined by the program so as to prograde the river mouth a user-specified number of kilometers." So, the accumulation of sediment by time steps can proceed until a predetermined total time period has passed or until the river mouth has prograded (moved forward) a predetermined distance. Neither termination condition is defined in terms of the deposited sediment being large enough to divert flow, which is the limitation now in claim 1, step (c).

Thus, the applicants believe that the Syvitski papers disclose (at least) neither step (c) nor step (e) of the applicants' claim 1, and claims 10 and 17 contain similar steps. Therefore the combination of the Syvitski papers cannot make the applicants' claims obvious.